

WHAT IS CLAIMED IS:

1 1. An arrayed waveguide grating, comprising:
2 a substrate;
3 a first channel waveguide disposed on the substrate;
4 a channel waveguide array disposed on said substrate and
5 constituted in such that each length of waveguides is sequentially
6 longer with a predetermined difference in lengths of the waveguides;
7 a first slab waveguide disposed on said substrate and
8 connecting said first channel waveguide with said channel waveguide
9 array;
10 a second slab waveguide disposed on said substrate and
11 connecting an end of said channel waveguide array on the side wherein
12 said first slab waveguide has not been connected thereto with an
13 end thereof; and
14 a second channel waveguide disposed on said substrate and
15 connected to the other end of said second slab waveguide wherein
16 a waveguide part in the connected area has a parabolic configuration.

1 2. An arrayed waveguide grating, comprising:
2 a substrate;
3 a first channel waveguide disposed on the substrate;
4 a channel waveguide array disposed on said substrate and
5 constituted in such that each length of waveguides is sequentially
6 longer with a predetermined difference in lengths of the waveguides;
7 a first slab waveguide disposed on said substrate and
8 connecting said first channel waveguide with said channel waveguide
9 array;

10 a second slab waveguide disposed on said substrate and
11 connecting an end of said channel waveguide array on the side wherein
12 said first slab waveguide has not been connected thereto with an
13 end thereof; and

14 a second channel waveguide disposed on said substrate and
15 connected to the other end of said second slab waveguide wherein
16 a waveguide part in the connected area has a configuration as a
17 multi-mode interference in which a width of optical waveguide
18 changes step-functionally and discontinuously.

1 3. An arrayed waveguide grating, comprising:

2 a substrate;

3 a first channel waveguide disposed on the substrate;

4 a channel waveguide array disposed on said substrate and
5 constituted in such that each length of waveguides is sequentially
6 longer with a predetermined difference in lengths of the waveguides;

7 a first slab waveguide disposed on said substrate and
8 connecting said first channel waveguide with said channel waveguide
9 array;

10 a second slab waveguide disposed on said substrate and
11 connecting an end of said channel waveguide array on the side wherein
12 said first slab waveguide has not been connected thereto with an
13 end thereof; and

14 a second channel waveguide disposed on said substrate and
15 connected to the other end of said second slab waveguide wherein
16 a waveguide part in the connected area has a rectangular field
17 distribution exciting configuration that excites a rectangular
18 field distribution.

SUBSTITUTE SPECIFICATION

1 4. An arrayed waveguide grating as claimed in claim 1,
2 wherein:
3 said parabolic configuration is individually adjusted in
4 response to respective wavelengths of multiplexed optical signals
5 input to said first channel waveguide.

1 5. An arrayed waveguide grating as claimed in claim 2,
2 wherein:
3 said configuration as a multi-mode interference is indi-
4 vidually adjusted in response to respective wavelengths of
5 multiplexed optical signals input to said first channel waveguide.

1 6. An arrayed waveguide grating as claimed in claim 3, wherein:
2 said rectangular field distribution exciting configuration
3 is individually adjusted in response to respective wavelengths of
4 multiplexed optical signals input to said first channel waveguide.

1 7. An arrayed waveguide grating as claimed in claim 3,
2 wherein:
3 said rectangular field distribution exciting configuration
4 is such a configuration that an angle θ_w defined by a boundary part
5 of an outputting channel waveguide in a starting point from which
6 a width of waveguide changes and a central axis of the waveguide
7 has a value larger than zero degree and smaller than ninety degrees,
8 and tapered configurations are excluded from these resulting
9 configurations.

1 8. An optical communication system, comprising:

2 an optical transmission means for delivering optical signals
3 having respective wavelengths in parallel;

4 a multiplexer composed of arrayed waveguide gratings for
5 subjecting the optical signals having the respective wavelengths
6 delivered from said optical transmission means to wavelength
7 division multiplexing;

8 an optical transmission line for transmitting the optical
9 signals which have been wavelength division-multiplexed and output
10 from said multiplexer;

11 nodes each provided with an arrayed waveguide grating disposed
12 properly in the middle of said optical transmission line;

13 a demultiplexer composed of an arrayed waveguide gratings to
14 which optical signals delivered through said nodes disposed on said
15 optical transmission line are input to separate into each of optical
16 signals having respective wavelengths; and

17 an optical receiver for receiving optical signals having the
18 respective wavelengths separated by said demultiplexer;

19 each of said arrayed waveguide gratings being composed of a
20 substrate; a first channel waveguide disposed on the substrate;
21 a channel waveguide array disposed on said substrate and constituted
22 in such that each length of waveguides is sequentially longer with
23 a predetermined difference in lengths of the waveguides; a first
24 slab waveguide disposed on said substrate and connecting said first
25 channel waveguide with said channel waveguide array; a second slab
26 waveguide disposed on said substrate and connecting an end of said
27 channel waveguide array on the side wherein said first slab waveguide
28 has not been connected thereto with an end thereof; and a second

29 channel waveguide disposed on said substrate and connected to the
30 other end of said second slab waveguide wherein a waveguide part
31 in the connected area has a rectangular field distribution exciting
32 configuration that excites a rectangular field distribution.

1 9. An optical communication system, comprising:
2 an arrayed waveguide grating having a circular transmission
3 line prepared by connecting circularly a plurality of nodes by means
4 of transmission lines and transmitting optical signals which have
5 been wavelength division-multiplexed to these transmission lines,
6 and separating the wavelength division-multiplexed optical signals
7 into optical signals having respective wavelengths; and
8 an arrayed waveguide grating for wavelength divi-
9 sion-multiplexing optical signals, which have been separated into
10 those having respective wavelengths;
11 each of these respective arrayed waveguide gratings being
12 composed of a substrate; a first channel waveguide disposed on the
13 substrate; a channel waveguide array disposed on said substrate
14 and constituted in such that each length of waveguides is se-
15 quentially longer with a predetermined difference in lengths of
16 the waveguides; a first slab waveguide disposed on said substrate
17 and connecting said first channel waveguide with said channel
18 waveguide array; a second slab waveguide disposed on said substrate
19 and connecting an end of said channel waveguide array on the side
20 wherein said first slab waveguide has not been connected thereto
21 with an end thereof; and a second channel waveguide disposed on
22 said substrate and connected to the other end of said second slab
23 waveguide wherein a waveguide part in the connected area has a

- 24 rectangular field distribution exciting configuration that excites
- 25 a rectangular field distribution.